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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,563	12/03/2003	Ephraim Gutmark	003-101	4002
36844	7590	01/30/2006	EXAMINER	
CERMAK & KENEALY LLP			COCKS, JOSIAH C	
515 E. BRADDOCK RD			ART UNIT	
ALEXANDRIA, VA 22314			PAPER NUMBER	

3749

DATE MAILED: 01/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Period for Reply

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Receipt of applicant's amendment filed 11/14/2005 is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-7 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,464,489 to Gutmark et al. ("Gutmark '489") (cited by applicant) in view of U.S. Patent Application Publication US 2001/0027638 to Paschereit et al. ("Paschereit").

Gutmark '489 discloses in Figures 1-7 and 10-12 an invention in the same field of endeavor as applicant's invention and similar to that described in applicant's claims 1-17 and 10-12. In particular, Gutmark shows a device and method for affecting thermoacoustic oscillations in a combustion system including a burner in which a gas flow forming in the region of the burner is excited acoustically (see Abstract). It is recognized that multiple frequency waves are introduced into a gas flow shear layer (see col. 2, lines 32-61) and that the acoustic excitation functions to counteract, and is thus coordinated with, the formation of any given interference frequency, including a fundamental frequency (see col. 3, lines 54-59). Gutmark '489 further discloses a control system that includes one or more acoustic sources (10) producing acoustic excitations of different phases (see col. 5, lines 22-63). Gutmark '489 also notes that the instantaneous acoustic excitation of the shear layer is phase-coupled with a signal measured in the combustion system that is correlated with the thermoacoustic fluctuations (see col. 3, lines 44-48). Gutmark '489 includes a recitation that oscillations in the combustion system may be controlled/affected by fuel injection modulation (see col. 3, lines 26-31) but does not appear to go into further detail concerning modulating the fuel injection or coordinating the fuel injection to affect the same interference frequency.

Paschereit teaches a system and method for affecting thermoacoustic vibrations in the same field of endeavor as both applicant's invention and Gutmark '489. In Paschereit, the thermoacoustic vibrations are controlled by means of modulating fuel injected with respect to time (see page 1, paragraph 007). Such modulation may be effected at any frequency (id. and page 2, paragraphs 0027-0029). The modulation is effected by opening and closing one or two fuel valves to control fuel quantity (see page 2, paragraph 0022). Paschereit also notes that the

Art Unit: 3749

fuel injection may be correlated with thermoacoustic vibrations measured in the combustion system (see page 2, paragraph 0017). The examiner considers that a person of ordinary skill in the art would consider this to be a teaching that both the fuel injection modulation and the acoustic excitation of Gutmark '489 would be correlated to affect the same interference frequency.

In regard to claims 11 and 12, Paschereit expressly provides for independent control of the modulation of the quantity of fuel injected as desired (see at least page 1, paragraphs [0011] and [0012]) and thus this quantity is properly regarded as a result-effective variable. It has been held that optimization within prior art conditions or routine experimentation of a result-effective variable is not inventive. See MPEP 2144.05(II). Therefore, to have selected a specific amount of this quantity, such as the recited less than the total quantity (claim 11) or 20% of the total quantity would be simply a matter of optimization of the teachings of Paschereit and is not regarded as patentably distinct.

Therefore, in regard to claims 1-7 and 10-12, it would have been obvious to a person of ordinary skill in the art to modify the system and method of Gutmark '489 to incorporate the fuel injection modulation of Paschereit as this fuel modulation technique is recognized to desirably control thermoacoustic vibrations in a combustion system for vibrations of any specific frequency (see Paschereit, page 1, paragraphs 0006 and 0007).

5. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gutmark '489 in view of Paschereit as applied to claim 7 above, and further in view of U.S. Patent No. 5,719,791 to Neumeier et al. ("Neumeier") (cited by applicant).

Gutmark '489 and Paschereit teach all the limitations of claims 8 and 9 except possibly for the recitation of the control system having separate control paths for the acoustic excitation of the gas flow and fuel modulation and that the two control paths each contain a time delay element for producing a phase shift.

Neumeier teaches in Figs. 1-8 a system for controlling oscillations in a combustion system in the same field of endeavor as both Gutmark' 489 and Paschereit. In Neumeier, it is noted that for each mode of oscillation (such as the acoustic excitation and fuel modulation of Gutmark '489 and Paschereit respectively) a separate control path that includes a time-dependent control signal with appropriate phase shift is generated (see col. 5, line 60 through col. 6, line 2).

Therefore, in regard to claims 8 and 9, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of the systems of Gutmark '489 and Paschereit to include separate control paths containing time delay elements for producing phase shifts as disclosed in Neumeier for the desirable purpose of optimizing the damping or enhancement of the modes of oscillation depending upon the objective of the system (see Neumeier, col. 6, lines 6-8).

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686

F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claim 7 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 7 of copending Application No. 10/725,564.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the structure recited in each of these claims is substantially identical. That the control systems function to affect different interference frequencies does not render the device claims distinct. This recited functioning of the control system is merely a recitation of the intended use of the control system and does not serve to structurally distinguish claim 7 of this application from claim 7 of Application No. 10/725,564. It has been held that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Art Unit: 3749

In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). As there is no recited structural difference between the claims they are not regarded as patentably distinct.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

8. Applicant's arguments filed 11/14/2005 have been fully considered but they are not persuasive.

Applicant essentially argues that the prior art does not suggest combining acoustic and fuel modulation approaches to dealing with thermoacoustic oscillations in combustion system. Applicant argues that Gutmark considers these two approaches to be alternatives. Applicant also states the following:

“*Gutmark* thus teaches away from a general combination of *Gutmark* and *Paschereit*, because the person of ordinary skill in the art would not expect to improve the “good” method with the “bad” method, as *Gutmark*’s disclosure characterizes them.” (Response, p. 10).

To support this assertion applicant points to column 3, lines 22-31 of Gutmark. This section of Gutmark is reproduced below:

chamber is only 0.6% of the suppressed power. As a further driving mechanism, flame and fluid flow dynamics in the combustion chamber, in particular thermoacoustic instabilities, can also be induced by changes in equivalence ratio. However, a comparison between the estimated OH change during one cycle of oscillation and the measured value showed that the driving mechanism which is initiated by the equivalence ratio (e.g. by fuel injection modulation) only plays a secondary role to the main mechanism related to flow instabilities.

This section has been carefully considered as well as the remaining disclosure of Gutmark. The examiner finds no such characterization that one method is “good” and another “bad” is present as asserted by applicant. Instead, the examiner notes that this section of Gutmark appears to suggest that the fuel injection modulation would be applied in conjunction with the correlation of acoustic excitation with thermoacoustic vibrations, albeit in a secondary role, to desirably provide another measure of control of oscillations in the system. As noted above, Paschereit is relied upon by the examiner to clearly demonstrate that the practice of fuel injection modulation is recognized in the art for the same purpose suggested in Gutmark, i.e. to provide a measure of control of oscillations in a combustion system through correlation of the fuel injection with thermoacoustic vibrations. A person of ordinary skill in the art in possession of these two references would reasonably conclude that the combination of the practice of correlating acoustic excitation with thermoacoustic vibrations with the practice of the correlation of fuel modulation with the same vibrations would desirably provide measures of control of the oscillations in the combustion system.

Applicant also briefly argues that the modulation of the equivalence ration specified in Gutmark is not the same as fuel modulation. However, the examiner notes that explanatory parenthetical noted in the section of Gutmark reproduced above which specifies that the

Art Unit: 3749

modulation of the equivalence ratio is performed via fuel injection modulation clearly contradicts applicant's argument. Accordingly, applicant's argument is not persuasive.

Applicant also argues that the double patenting rejection applied to claim 7 is not proper. However, as previously noted and noted above, claim 7 of this application and claim 7 of Application No. 10/725,564 are apparatus claims that are not structurally distinguished from one another as the described function of use of the control system does not describe any patentably distinct structure. As noted above, this rejection is maintained.

For the reasons articulated in this Office action, applicant's claims are not regarded to patentably distinguish applicant's invention over the prior art.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

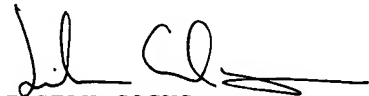
Art Unit: 3749

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Josiah Cocks whose telephone number is (571) 272-4874. The examiner can normally be reached on weekdays from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg, can be reached at (571) 272-4828. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal/pair>. Any questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

jcc
January 24, 2006


JOSIAH COCKS
PRIMARY EXAMINER
ART UNIT 3749